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OBSERVATIONS ON THE CRESTED SERPENT EAGLE (*SPILORNIS CHEELA*) IN RAJPIPLA FORESTS — SOUTH GUJARAT¹

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(With five plates and a text-figure)

INTRODUCTION

The Rajpipla forests comprise the highland area at the western extremity of the Satpura range between the Tapti and Narmada rivers (21°50'N 73°30'E). The forests get the name from the nearby Rajpipla town, capital of the former princely state of Rajpipla, in which these forests were included. The forests are basically of two types : Tropical semi-evergreen and moist-deciduous. There are some excellent patches of forests remaining around Juna Raj, Namgir and Piplod areas of both bamboo and moist-deciduous types. This area of the Satpuras is of great importance in Indian ornithology and it is almost the meeting point of the northernmost end of the Western Ghats with the westernmost tip of the Satpura range which in itself has been regarded as an ornithological highway in Indian Ornithogeography (Sálim Ali — Guj. Res. Soc. Vol. 10).

We first visited these forests in June 1981

for the sole purpose of assessing its potential for photographing the bird life with a possible emphasis on raptors. Within a few days we observed a great concentration of the Crested Serpent Eagle, *Spilornis cheela*, and other birds of prey for which unfortunately we were too late that year. As the Serpent Eagle was still breeding here in June, the help of the local adivasis was sought and within a few days five nests of this eagle were located. We then concentrated on observing in detail the behaviour and nesting habits of the eagle. Though this eagle is common throughout the subcontinent, there is little available information on it. Besides, it may also be added that during our visits to these forests we observed several birds hitherto not recorded from this area.

METHODS

Most of the observations on the Crested Serpent Eagle were made from hides. Over

200 hours of observations were made from hides during photography sessions. The birds were also observed to a lesser extent on foot, while moving about in the forests from hill tops and in the valleys.

The peninsular Indian race, *Spilornis cheela melanotis* (Jerdon) is resident in peninsular India south of the Gangetic plain, arbitrarily south of lat. 25°N, from Gujarat east to Bengal and south to Kanyakumari (HANDBOOK Vol. I, pp. Salim Ali & Ripley). Besides these two, there are four more races confined to Sri Lanka, Burma, Andamans and Nicobars.

As mentioned at the outset, we first reached these forests in January 1981, when these eagles could be commonly heard from almost every hill and valley. It was not easy initially locating the birds as we were still inexperienced in finding nests, we thus recruited local help for doing so and this proved rewarding. Eventually, five nests were located. Among these, one found on the 18.vi.1981 afternoon had been tampered with and part of the nest was lying on the ground. Our adivasi cook, Naika, spread word around and on the 19.vi.81 morning during a five hour walk beginning at 3.30 a.m. two more nests were located — one of these in a hopeless location for photography, high up on a very big tree on a massive hill. An adivasi boy hired to climb the tree to check its contents had almost reached the nest, when an eagle which had been sitting very close erupted into action and flew off, unsettling the boy considerably. The nest was empty. The nest was very large and as it was very early in the morning, the eagle was probably using it as a roost. About this nest it may be added that it was the largest Serpent Eagle nest that we saw in the Rajpipla forests. One other nest found in the Murud-Janjira forests, south of Bombay, compared

with this nest in size. The second nest located by Bhanga our main adivasi helper was rather small in size. In fact on first sighting it appeared to be a loose collection of twigs and sticks. Bhanga climbed the tree and reported that it contained a nestling. To prove it, he picked up a small downy eaglet from the nest and showed it to us before replacing it back in the nest. A long wait then ensured the confirmation of the identity of the eagle. The same morning we were shown another nest of *Spilornis cheela* near Sankhri village. The nest at Sankhri was also not a large one and contained a fully fledged eaglet (Plate I), which was initially invisible as it was sitting very close and stood up in the nest only when an adult arrived calling and perched nearby. Near Namgir, Bhanga showed us two more nests of this eagle but both were empty. The construction of the machan for photography commenced on 22.vi.81 working for about an hour each day. Five adivasis under our supervision completed the machan by 29.vi.81. The following year, 1982, another nest near Namgir was observed and photographed. (Plate I).

Spilornis cheela melanotis (Jerdon) is common in the Rajpipla forests. As a matter of fact, we would not hesitate to consider this eagle as abundant in these forests.

On occasions when the chick was about 15 days old and not brooded continuously we observed the eagle in the afternoons, perched on a high branch of some large tree overlooking the nest, keeping a watchful eye on the eaglet.

On the only day that SM entered the hide on 11.vi.82, a roller was observed to alight on the nest tree a few feet above the nest calling harshly. This immediately elicited a response and both adult eagles appeared at the nest — the only time they were seen together. The roller flew off immediately. With both

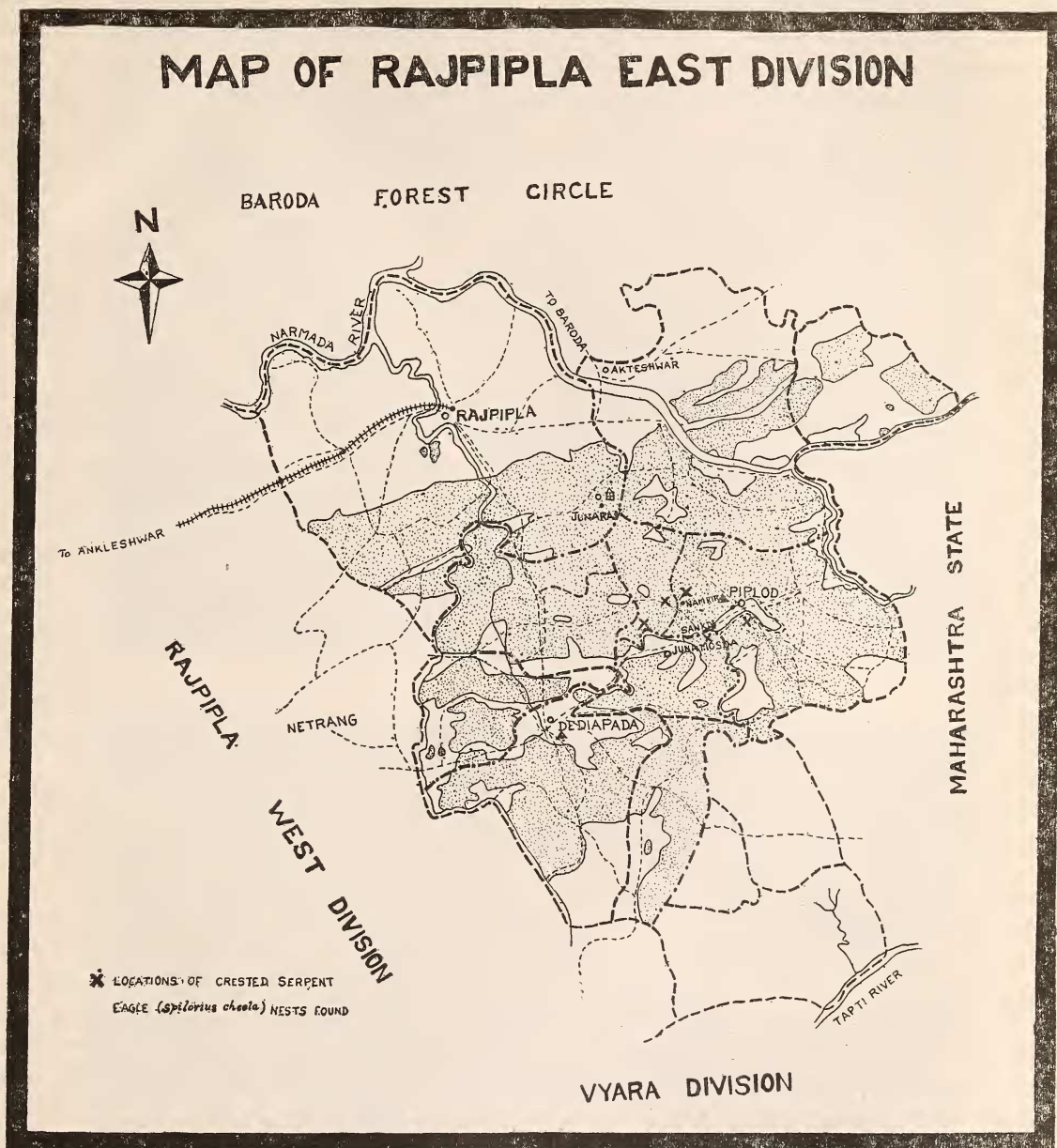


Fig. 1.

eagles at the nest comparison was relatively simple. One of the birds was distinctively smaller in size and lighter in colour. Both eagles must have been in the near vicinity to arrive at the nest as normally only one of the eagles was somewhere around near the nest. Besides these, some 16 other birds were observed to alight on the nest tree: for example, the little sun-bird which flitted and hovered at the very rim of the nest and performed aerobatics right in front of the nestling which stared at them in fascinated concentration. Other than a stray roller and a jungle myna, no other large bird was seen on the nest tree, though on one occasion when an adult Serpent Eagle was perched near the nest two others were circling and calling about 200 feet above the nest. On yet another occasion, I (RKN) saw a large unidentified raptor flying past the nest without unduly alarming one of the adults which half-heartedly followed it for a short distance. A pair of the same birds of a different species were noticed around a large nest nearby (70 metres from the *cheela* nest) and did not seem to be alarming the serpent eagles. Leslie Brown has observed that different species of African Raptors nesting in close proximity to each other are generally tolerant of each other, but not to the same species. Visits to the nest would decrease and sometimes no adults would be seen for 6-7 hours when the eaglet was in the secondary downy stage. During the eaglet's first two and a half weeks the female — would spend most of the time brooding particularly continuing after the cool hours of the morning are over, till late evening after it had cooled. The adult bird would tuck in the eaglet and sit lightly over it, panting due to the heat. Brooding would be interrupted when the male arrived with the food and during feeding. On some days when extra snakes are caught the prey would be dropped

into the nest next to the eaglet and brooding would recommence without feeding. The brooding female, had an outpost on a nearby tree overlooking the valley below on one side and on the other the nest. It was on this perch that she would spend the early hours of the morning and evening when it was cool.

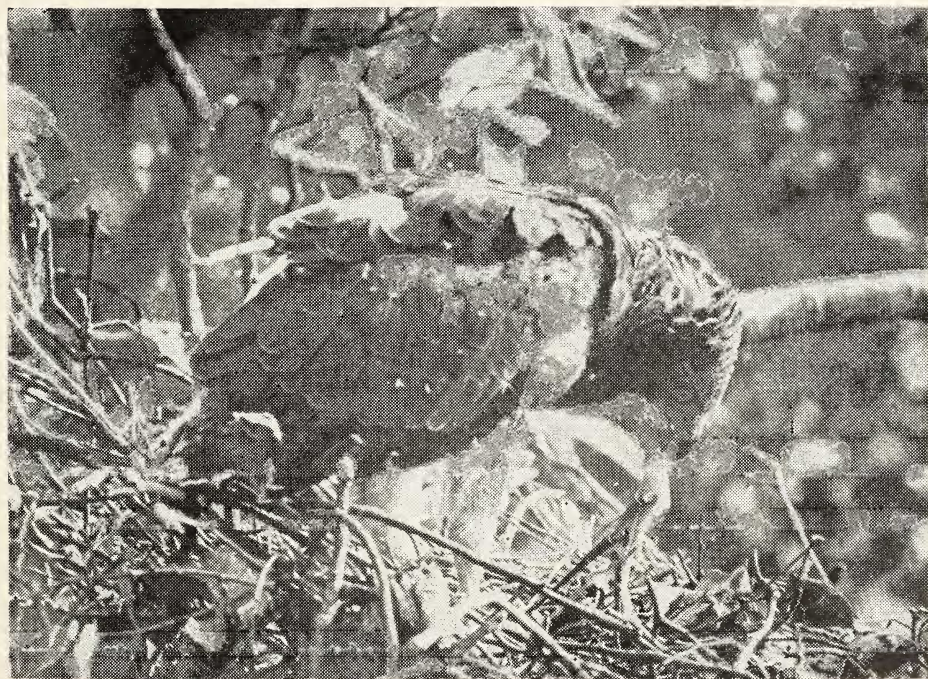
NEST & EGG

In Rajpipla forests we noticed that the nest of *Spilornis cheela* distinctly appears small for a bird so big. This has also been observed and written about by several earlier authors. In fact it may be stated that the very first occupied nest of *Spilornis cheela* that was located and checked on 20.vi.81 was so small and ill-made that it seemed rather hard to believe that this particular nest actually contained a nestling and that too of an eagle. Most of the other nests that we observed in this area were of a rather small size, with a diameter of about 1½ feet. Nests of *Spilornis cheela cheela* vary in size from 1.5-2 feet in diameter and from "4-8" inches in thickness (Hume: Nests & Eggs of Indian birds, iii, p. 154).

We observed that the nests of this race are never on the top of trees but always somewhere half-way to ¾th way up, on some fork, often one jutting from the main stem.

From among the nests we observed and checked it was noted that the nest-cup is deep and is lined with green leaves and twigs. We never actually saw the eagles bringing any leaves or twigs even though we saw fresh leaves and small branches often in the nest. Perhaps, Major Cock's surmise about *Spilornis cheela* using twigs and leaves of the very tree on which it nests, for its nest, holds true for *Spilornis cheela melanotis* too.

The depth of the nest in the half a dozen nests we actually checked varied from a few



Above: Crested Serpent Eagle (*Spilornis cheela*) at the nest. Below: Fully fledged young eating a very large Rana (*Rana tigerina*). Length of hind leg measured 260 mm. Note undeveloped tail.

(Photos: R. K. Naoroji)



Adult Crested Serpent Eagle (*S. cheela*) bringing half-eaten unidentified mammal in left foot to the nest.
(Photo: R. K. Naoroji)

CRESTED SERPENT EAGLE

inches to slightly over a foot. In one of the nests observed on 19.vi.81, the nest cavity was exceptionally deep. SM on one occasion was a good way above the level of the nest and could clearly look into it. It was only when an adivasi boy had climbed to within a few feet of the nest that the bird flew off. In spite of being above the nest at a favourable angle, the eagle was not visible and this also supports the view held by others that *Spilornis cheela* is a very close sitter. Leslie Brown has noticed this among African Snake Eagles and also Baker (NIDIFICATION Vol. 4). On another occasion RKN climbed to a nearby hillock but was still unable to see the contents of a nest. Our aim being to photograph these eagles, it was decided to sit nearby and observe the nest to see if it was occupied. After an hour, the characteristic three-bar call of an adult serpent eagle was heard and minutes later, the bird arrived, alighting on a tree 25 feet away from the nest-tree calling vociferously. The nest which had looked empty came to life and a fully fledged juvenile stood up and called as energetically as the adult. It had been till then sitting tightly on the nest, making no sound at all to give its presence away. Baker (NIDIFICATION Vol. IV) writes that *Spilornis cheela* often adds fresh material to its nest every year as a rule, though sometimes they lay in the most dilapidated and ill-repaired nest. Judging from the nests we checked we feel that only occasionally does this eagle add fresh material and hence rarely uses a particular nest for several successive seasons, though on rare occasions a nest might be used successively. The two large nests found, one in Rajpipla used for a nightly roost and another in the semi-evergreen forest of the Murud-Janjira coast, could be exceptions but this is only a surmise.

In Africa, Leslie Brown observed that the

Snake Eagles (*Circaetus*) usually build a new nest every year, in close proximity to the previous year's nest site. We feel that the same could probably hold true for the Serpent Eagles in Rajpipla and this should be looked into in greater detail.

From among the seven nests of *Spilornis cheela melanotis* that were observed and checked during two nesting seasons (1981-82), four were on the Sadada (*Terminalia tomentosa*) trees while the occupied nest at Mozda was on a Sheeshum (*Dalbergia sissoo*) tree. The sixth was on a Timru (*Diospyros melanoxylon*) tree and the seventh nest tree remains unidentified.

Judging from the above *Terminalia tomentosa* appears to be a favourite tree of raptors to make their nests. At least four nests of the Shikra (*Accipiter badius*) were also on *Terminalia tomentosa*.

In the four occupied nests that were observed, three had one nestling each when first located and only one of the nests contained an egg on 13th May, '82.

We did not check any egg in the Rajpipla forests but the nest which contained an egg found on 13th May, '82 was, according to our adivasi friend, Banga, unmarked dirty-white in colour.

So far in our experiences with these eagles, only one egg/chick has been noticed in occupied nests.

FEEDING & FOOD

As the name of this eagle suggests it largely feeds on snakes and will attack even large sized snakes. Even the rat-snake, some as long as 5 feet are tackled and killed with ease and they seem to destroy poisonous snakes with as little fear as the harmless ones (Baker, FBI: Vol. 5).

The following prey species were observed being brought to the nest during his photographic visits. All species observed were non-poisonous and the main varieties were the tree snakes.

(a) Snakes: i) Bronze-back (*Dendrelaphis tristis*) ii) Vine Snake/Whip Snake (*Ahaetulla nasutus*) iii) Rat Snake/Dhaman (*Ptyas mucosus*) iv) Olive keel-back (*Aretium schistosum*) v) Striped Keel-back (*Amphiesma stolata*).

(b) Half-eaten and almost mangled carcasses of a mammal with fur — brought twice — once on 30th May 1982, and on 3.6.'82. (Plate II).

(c) Lizards: Two species of lizards were brought to the nest. One of these was easily recognizable as a *Calotes*; the other beautifully mottled in colour like the bark of a tree.

(d) Frog on one occasion, possibly a *Rana*.

(e) Perhaps even junglefowl, domestic fowls and probably other ground birds as reported by the adivasis.

A. Anderson (P.Z.S. 1872, p. 77) writes that *Spilornis cheela* subsists almost entirely on green frogs. Baker (FBI, 5) considers that even though snakes are the principal prey of *Spilornis cheela*, when snakes are not to be found this eagle will eat reptiles, birds of all kinds upto the size of the largest pheasants, partridges and ducks and also grubs and larger insects.

The adult eagles always brought snakes to the nest in their beaks. The mammals though on one occasion were brought in the beak and once in the talons. It seems that heavier and compact prey is brought to the nest in the talons. Probably a snake carried in the talons for the last few metres to the nest might interfere with the landing. On one occasion, a snake was actually seen being killed. While RKN was photographing from the hide SM was

observing the hide concealed nearby. Lying thus on the ground, a rustle was heard and a Dhaman seen 25 feet away. Suddenly, a Serpent Eagle landed on the ground a few feet away from the snake. Cautiously disregarding SM it walked briskly towards the snake "like a large chicken" with wings wide-spread. The snake by now trying to make its escape reached the base of a large tree. The eagle had to run around the tree thrice in its attempt to pin down the escaping snake. The third time it managed to sink in its talons just behind the snake's head. After looking at SM fiercely it gave a squawk and flew to a nearby tree with its prey where it commenced to bash and twist it with beak and claw for about 10 minutes. It then flew to a perch behind the hide for 30 minutes before alighting at the nest.

When the snake appeared at the nest it was noticed that it had been beheaded. In EAGLES, HAWKS AND FALCONS OF THE WORLD, by Leslie Brown and D. Amadon, it is stated that *Spilornis cheela* sometimes pick dead snakes and that all prey is taken on the ground.

On 5.vi.'82, some jungle crows were observed mobbing something very excitedly in the vicinity of Mozda village near Namgir where an occupied nest of *Spilornis cheela* was located. Seconds later, a Serpent Eagle, one of the Mozda breeding pair rose from the river bed with a large snake in its talons and settled further along the right bank of the river. On (RKN's) approaching closer for a better look, it left the snake on the ground and flew to a tree across the river. The snake was identified as a 5 ft. rat-snake which had recently been killed as the carcass was far from being stiff. About 8 inches of flesh had been eaten from head downwards, exposing the vertebrae. This pair were observed to hunt along this stretch of river for two consecutive nesting seasons.

CRESTED SERPENT EAGLE

The adults arrival with food is heralded by alarm calls of jungle mynas, parakeets and babblers and the parent birds would have a fixed approach or route to the nest, though on rare occasions a different approach would be adopted. The normal route was to fly directly to a large nest-supporting branch to the left of the nest. The final few feet down to the nest would be covered by hopping down with wings partially wide-spread for balance. On two to three occasions an adult was seen approaching the nest directly and alighting on it, and sometimes from the right. The eaglet is fed very carefully and care is taken not to directly step on it. Feeding is done with great delicacy with that fearsome beak and food is generally held out near the beak of the chick which takes it on its own. When the chick is very tiny (about 4 to 10 days old) very small morsels are fed and the chunks of meat torn out and fed increase in size along with the eaglet's growth and capability of handling and swallowing large morsels. Nothing is wasted and slivers of meat that are flicked to the edge of the nest are immediately retrieved and fed. Interestingly enough this has been observed by F. Truslow on the Bald Eagle and I (RKN) have also seen the female Shikra interrupt the feed to retrieve pieces of meat from the nest-rim. The eaglet is coaxed when it refuses to eat and on two occasions an unusual feeding posture was observed and photographed to coax the chick to feed.

On one of her visits to the nest the female could not get the chick to accept even a beak full of food. She tried to coax the chick in a variety of ways. Firstly by calling softly and then by tapping beaks very gently with the chick. The chick, still not responsive to her feeding overtures kept its beak closed whereupon the adult adopted the upside down head

posture as shown in the photograph, and this proved successful. (see plate III).

All large snakes e.g., Rat Snakes, were brought beheaded to the nest while small slender tree snakes like the bronze-back and the vine snake were brought with heads intact but battered and swallowed head first by the chick. When the chick was a few days old it was observed that on a few occasions the adult would tear the snake in half and feed the tail end of the snake to the young. The 15 days old chick was capable of swallowing a 3½ ft. Dhaman when very hungry. It would take a rest every now and then looking very comical with the unswallowed tailend hanging out from its beak. On two other occasions when the same species of mammal (unidentified) was brought to the nest the animal had been torn in half and partly mangled. Head and feet were missing but the tail and part of the body was intact. Most probably the other half had been eaten by the hunting partner and was torn up to facilitate carrying it to the nest. Fur, skin and bones — everything was eaten. The eaglet would very often fall into a deep slumber after a heavy meal. Some of the African snake eagles, according to Leslie Brown, swallow snakes and regurgitate them to their chicks which pull them out of the adults' crop. Lizards were brought intact along with frogs to the nest and on one occasion a lizard was observed being torn lengthwise. On yet another occasion a lizard brought to the nest was torn in half and fleshy morsels from both halves were fed to the chick. Then the halves were separately swallowed by the eaglet. Sometimes while feeding the chick the adult also feeds itself but leaves the choicest fleshy parts for the chick.

On many occasions food in the form of snakes would be stored in the nest. Once

a snake was brought and dropped beside the chick. The adult brooded the chick till late afternoon after which she fed the morning's catch to the chick. The same was observed with a carcass of a mammal present in the nest and fed later. On another occasion, I (RKN) entered the hide in the afternoon after a heavy morning's rain had subsided and present in the nest along with the chick was a large Dhaman. An adult could be seen from the peep-hole perched nearby. Later a crescendo of eagle calls were heard close to the nest and to the accompaniment of myna's alarm calls an adult arrived with a longish Bronze-back (head intact) (see Plates IV & V) and merely dropped it into the nest, along with the rat-snake. The female brooded for an hour and a half and then flew to her favourite evening perch overlooking the nest and the valley below. Later in the evening after the chick had called hungrily for some time she appeared at the nest and fed small morsels of the rat-snake to the eaglet. This storage of food was seen on a number of occasions. After the chick is about 20 days old, brooding decreases and the adults visit the nest for the sole purpose of bringing food. As the fledgling get older and can tear up prey on its own, these visits become extremely short and only two or three minutes are spent at the nest after dropping in the food. Food bringing intervals also increase and later during the young's development only one or two food bringing visits are made during the day. As prey species are more easily found during the rains, we found many nests occupied at the outset of the monsoon and nesting carried on sometimes even into August, though most nested during the months of end May to July coinciding with availability of prey species. Tree snakes too would be easier to hunt during the rains.

Most of the feeds that were observed were

generally in the late afternoons and the late morning hours. Some kills must have been made very early in the morning as on several occasions snakes were seen present in the nest at 8 a.m. when the previous evening at dusk no prey was observed in the nest.

VOICE AND CALLS

On our very first day in these forests in June 1981, we could commonly hear the calls of this eagle. There was not a single day on our trips, when we did not hear *Spilornis cheela*. We observed that this eagle has a good variety of calls and is very vocal during its breeding season.

The ordinary call notes of *Spilornis cheela* are loud and high pitched whistling screams, something like Kek Kek Kek, or Kee Kee Kee, while soaring but sometimes also from a perch (Sálim Ali and Ripley, S. D. in Handbook Vol. 1, p. 331).

The calls of *Spilornis cheela* are among the commonest raptor calls we heard in the Rajpipla forests. It was noted that *Spilornis cheela* is much more vocal when soaring high up rather than when perched.

Davison (SF: X, p. 337) on *Spilornis cheela melanotis* (the peninsular & south Indian bird) writes, "Silent as a rule when seated. Occasionally as it flies and takes off it utters its wild plaintive note, more often when circling up".

We feel that the calls of *Spilornis cheela melanotis* (we strongly suspect it to be *melanotis*) have not been properly described. The commonest call of this bird, that we heard in the Rajpipla forests can be best described as:

(a) phtueeeee tue tueeu
 or
 Kueeeee Kue Kueeeh
 (I) (II) (III)
 in three syllable notes.

The first note of *Spilornis cheela* that we so



Unusual feeding behaviour of the Crested Serpent Eagle (*S. cheela*).
On one of her visits to the nest the female *S. cheela* could not get the chick to accept any morsel of food. She tried to coax the chick in a variety of ways. Firstly by calling softly and then by tapping beaks very gently with the chick. The chick still did not respond and kept its beak closed whereupon the adult adopted the posture as shown in the photograph and this proved successful.
(Photo: R. K. Naoroji)



Bringing a Bronze-backed snake to pre-feeding perch.
(Photo: R. K. Naoroji)

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commonly heard in Rajpipla is considerably longer being almost twice as long as both the following notes together. Most authors have described the first note of *Spilornis cheela* as very short and 'almost fading away'.

(b) Frequently this eagle, when perched in the afternoons somewhere high up on a large tree overlooking the nest utters a shrill, prolonged whistle Keeeeee..... which would be repeated as many as 5-6 times in quick succession.

A rather harsh single note was heard on 11th June, 1982. One of the adult birds was perched on a nearby tree not far from the nest when it suddenly emitted a harsh 'Khweerar.....'. This particular note was also long drawn and it was the only time this call was heard.

As the Serpent Eagles were vocal at their nest, a variety of calls of different intensity and cadence were heard and it was noticed that they are particularly vocal when prey is brought to the nest. There are often many variations in the tone but the most frequently heard call was the triple syllabled "Keeeu..... Keu..... Keu," the first note being extremely prolonged.

Most of the time, for the first few days of the eaglets life, the adult female *Spilornis cheela* would be brooding at the nest and for long periods there would be absolutely no sign of her mate. On many occasions it was noticed that during brooding the female would look skywards and let out a shrill croak or a 'squawk' as if summoning the male. This squawking call was totally unlike the yelping whistling screams typical of the Serpent Eagle. If the mate arrived with prey the female would fly off voicing this unusual squawk. The male would then reply — a true rendition of a Serpent Eagle call and after a wait of generally about twenty minutes or even more or less the pair would be seen perched on a near-

by tree with a snake or the female would directly fly to the nest with food within a few minutes.

On 2nd June 1982, the nestling was left unattended for what seemed to be the longest period observed. In the afternoon after 5 hours of being left alone the eaglet called incessantly. Suddenly with a swoosh of wings, the female alighted on the nest. She brooded for the next fifteen minutes and then emitted her squawking call and flew away calling characteristically 'Keeeu... keu... keu'. She circled low above the nest and continued calling thus. Soon she was answered by her mate and after disappearing for just a few minutes, arrived with a lizard.

From these similar observations it appears that the squawking call is synonymous to the female's recognition call, and was also heard when the eagle at the nest was suddenly surprised by the presence of the mate in the vicinity or when he arrived with food.

The squawk of *Spilornis cheela* appears to be reminiscent of the alarm call of the Great Indian Horned Owl (*Bubo bengalensis*) and I (RKN) also liken it somewhat to the call of the Night Heron (*Nycticorax nycticorax*).

Almost 60 per cent of our approaches to the hide were greeted by the calls of *Spilornis cheela*. I (RKN) would particularly like to mention 3rd June 1982. On this day the eagles were more vocal than on any other day. Some of their calls were extremely high-pitched and penetrating, and variations in tone, pitch and half-notes were clearly discernible and difficult to describe in writing. Even when the pair were away from their nest and soaring high up, their calls were clearly audible at intervals throughout the day.

On another visit during the nonbreeding season during December-January, we always heard these eagles while they soared, though not